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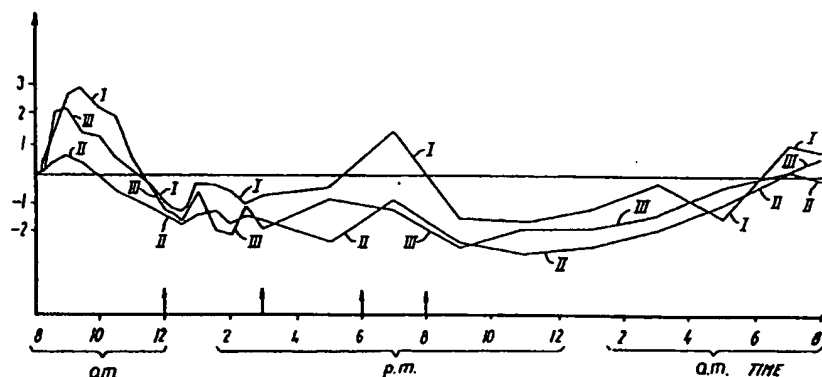
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(54) Title: BLOOD SUGAR DECREASING BREAD-LIKE PRODUCT FOR DIABETICS AND A POWDERY MIX FOR PRODUCING SAME



BLOOD SUGAR INCREASE mmol/t

(57) Abstract

A bread-like product having a blood sugar reducing effect for diabetics is manufactured by baking of a dough that comprises the following ingredients: (a) soya protein, (b) a fibre component comprising at least 50% by weight of wheat bran, (c) vegetable oil, (d) a fat-containing, substantially starch-free nut and/or kernel component, (e) a preferably viscous, possibly protein enriched, low-fat sour milk product, possibly in the form of a dry powder, (f) egg white, possibly in the form of a dry powder, and (g) a leavening agent, the weight ratios of the ingredients, calculated on dry matter, being as follows: (a) to (b) from 0,3 to 3 (understood as the value of a/b being in the interval from 0,3 to 3), ((a)+(b)) to (c) from 3 to 8, ((a)+(b)) to (d) from 3 to 7, ((a)+(b)+(d)) to (e) from 8 to 12 and ((a)+(b)+(d)) to (f) from 12 to 20. The product is a bread-like product, which in isocaloric amounts can replace conventional bread whereby a long-acting blood sugar reduction is obtained.

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BLOOD SUGAR DECREASING BREAD-LIKE PRODUCT FOR DIABETICS AND A POWDERY MIX FOR PRODUCING SAME.

5           The present invention relates to a bread-like product having a blood sugar reducing effect for diabetics, and a powder mix, which upon mixing with water and vegetable oil forms a dough, that may be baked to a bread-like product having blood sugar reducing effect for diabetics.

10           It is well known among nutrition experts that the diet for diabetics should be adapted so that occurrence of high blood sugar concentrations is prevented.

          The most obvious way of avoiding undesirably high blood sugar concentrations is to reduce consumption of  
15 digestible carbohydrates including starch.

          However, with the selection of foods generally available it is difficult to establish a diabetic dietary, which ensures the blood sugar concentration being kept at sufficiently low levels while at the same time ensuring  
20 that the patient gets sufficient and appropriate nutrition in general and that the meals appear as normal and tasty meals fitting into common eating habits.

          To reduce consumption of starch it has been proposed to replace the patients' consumption of bread totally or  
25 partly by the consumption of various substitutes thereof.

          The bread replacer products so far proposed, however, have all shown various disadvantages such as: Too high protein content, which may cause renal trouble, a taste, consistency or physical appearance deviating from those of  
30 bread to such an extent that the products are not regarded and accepted as bread replacer, or the products have contained such large amounts of industrially manufactured, partially synthetic ancillary ingredients, which are normally not present in such amounts in ordinary bread,  
35 that the bread substitutes were not accepted as "natural" foods.

          Thus, from DE-A-24 38 597 a low carbohydrate pastry

for diabetics is known, which contains less than 4% digestible carbohydrates, the sugar having been replaced by a sugar substitute such as sorbitol, and the flour having been replaced by a flour substitute mix that contains wheat  
5 gluten, soya protein and a thickening agent such as locust bean flour, gum arabic or a cellulose derivative such as methylcellulose or carboxymethylcellulose. Such pastry will have no similarity to bread and as appears from the published patent application the invention described  
10 therein relates to cake or biscuit-like products the roll of which in a diabetic diet would be very limited.

From DE-B-28 47 876 it is known to manufacture a pastry with a particularly high protein content from wheat gluten, bran, milk protein, soya protein, salt, yeast, and  
15 water. However, the invention described therein relates to brittle, rather snack-like products, which have no similarity with real bread and besides they contain protein in amounts that are too large for the product to be suitable as bread replacer in a diabetic diet. Furthermore, the  
20 product is almost without any content of food fibres. The application as bread replacer for diabetics is not mentioned in the patent specification either.

Gluten-based baked products with a reduced starch content are known from US-A-3,348,951. It is stated therein  
25 that the products may be manufactured with a bread-like appearance, they would, however, not be suitable for diabetics because they have a too large starch content. This is due to the facts that the products may contain a considerable amount of flour and that the gluten qualities  
30 used in the bakeries usually contain some amounts of starch, gluten completely free of starch providing a far too hard texture to the baked product. Furthermore, the large proportion of gluten provides a protein content of the product larger than appropriate for diabetics.

35 GB-A-2 022 391 is directed to a bread that besides flour contains from 5 to 50% of non-assimilable carbohydrate based gum or mucilage products, such as guar gum,

locust gum, pectin or watersoluble alkylcellulose together with gluten in an amount that is sufficient for stabilization of the bread texture. It is stated in the patent application that the bread has a reducing effect on the  
5 cholesterol and glucose content of the blood. Such bread must be regarded as especially suitable for administration of said gums or mucilages to patients in need of the cholesterol-binding effect of these substances. It would, of course, not come into consideration to include it as a  
10 bread replacer in a standard diet for diabetics who are not in hypercholesterolaemia therapy. Furthermore, the flour content of the product, which apparently typically comprises 20-50%, calculated on dry solids, will prevent the maintenance of a low blood sugar concentration, since  
15 omission of starch from bread has to be almost total to be reflected in a significantly reduced blood sugar concentration as substantiated and further explained below.

US-A-4,442,132 relates to pastry for diabetics, which contains less than 10% of digestible carbohydrates and  
20 which is manufactured from a dough primarily comprising whole egg or egg albumin, calcium caseinate, wheat flour in an amount of up to 15%, chopped nuts, and 5-50% by weight of a sugar alcohol selected among lactitol, sorbitol, and xylitol. Thus, a cookie-like, brittle product is dealt  
25 with, which does not have the appearance of bread and which, apart from the nut addition, does not contain food fibres. Even if the product is stated to be suitable for diabetics it obviously cannot serve as a proper bread replacer.

30 Many other products in which, with various objects in mind, the flour has been completely or partly replaced by other materials, have been proposed, however, for the reasons explained above none of them are suitable for totally or partly replacing of bread on an isocaloric  
35 basis.

According to the present invention it has, however, turned out that by the use of the ingredients defined

below, which are all natural food ingredients, in the proportions specified, it is possible to obtain a bread-like product that fulfils the conditions specified above for a bread replacer for diabetics, which makes it suitable as an isocaloric substitute for bread in a diabetic diet. Furthermore, it has turned out that consumption of the bread by diabetics yields a surprisingly efficient and protracted reduction of blood sugar concentration, as further explained below.

10       The product according to the invention is characterized in that it is manufactured by baking a dough comprising the following ingredients:

- (a) comminuted soya protein,
  - (b) a fibre component comprising at least 50% by weight of wheat bran,
  - (c) vegetable oil,
  - (d) a fat-containing, substantially starch-free nut and/or kernel component,
  - (e) a preferably viscous, possibly protein enriched, low-fat sour milk product, optionally in the form of a dry powder,
  - (f) egg white, possibly in the form of a dry powder, and
  - (g) a leavening agent,
- 25       the weight ratios between the ingredients, calculated on dry matter, being as follows:

- (a) to (b) from 0,3 to 3 (understood as the value of  $a/b$  being in the interval from 0,3 to 3),
- ((a)+(b)) to (c) from 3 to 8,
- 30       ((a)+(b)) to (d) from 3 to 7,
- ((a)+(b)+(d)) to (e) from 8 to 12 and
- ((a)+(b)+(d)) to (f) from 12 to 20.

In addition to the said ingredients (a) - (g), common ancillary materials including salt may be used in the manufacture of the dough, and for mixing of the dough water or milk including skim milk or buttermilk is used.

In a preferred embodiment the ingredients are

incorporated in the following ratios:

- (a) to (b) from 0,5 to 2,
- ((a)+(b)) to (c) from 2 to 7,
- ((a)+(b)) to (d) from 4 to 6,
- 5 ((a)+(b)+(d)) to (e) from 9 to 11 and
- ((a)+(b)+(d)) to (f) from 14 to 18.

In connection with the individual ingredients the following details should be noted:

10

(a): Soya protein is selected partly on account of its excellent nutritional properties and its amino acids composition in particular, partly because together with the other ingredients it makes it possible to obtain a bread-  
15 like texture without the use of flour.

(b): At least 50% of the fibre component comprises wheat bran. With a content of almost 40% indigestible food fibres wheat bran provides a suitable amount of these in the finished bread and it is particularly the wheat bran  
20 that provides bread taste to the product. If it is desired to make this bread taste less intense or if a lighter type of bread is required, taste-neutral fibres may comprise up to 50% of the fibre component, particularly ground wheat straw cellulose known as "wheat fibres" coming into  
25 consideration.

(c): From a baking standpoint and considering the requirements to the organoleptic properties and the texture of the finished bread almost any vegetable edible oil may be used and this may therefore be selected exclusively out  
30 of nutritional and economic considerations. If it is desired to obtain a low ratio between the total cholesterol content and HDL-cholesterol of the blood an oil having a large content of mono-unsaturated fatty acids such as olive oil may be selected while, alternatively, a multi-unsaturated oil such as grape seed oil, corn oil or soya oil may  
35 be selected if a general lipid reducing effect is given the highest priority.

(d): This ingredient is primarily incorporated to obtain a good taste and texture of the finished bread said ingredient together with ingredient (c) masking the organoleptically disadvantageous texture of the finished bread, which might otherwise be imparted to the product by the large content of the ingredients (a) and (b). The product exhibits what is generally known as a better mouth feel. The ingredient (d) may typically be desiccated coconut, which is free of starch and relatively inexpensive, but also other products such as sunflower seeds, sesame seeds etc. come into consideration.

(e): The low-fat sour milk product, which possibly may be protein enriched, is incorporated partly for nutritional reasons and partly to provide consistency and cohesion to the dough when the products are viscous. Examples of suitable sour milk products are Ymer or preferably Ylette®, which are protein enriched sour milk products manufactured from whole milk and low-fat milk respectively.

(f): The egg white serves as a natural binder, which is required as a substitute for the binding effect normally yielded to ordinary bread by the flour gluten and starch.

(g): The leavening agent is preferably yeast plus sugar in an amount, which does not very much exceed that which is consumed by the yeast when acting as a leavening agent. The amount of yeast used will typically be a little larger than that used in conventional bread manufacture. Alternatively, the leavening agent may be baking powder or another chemical leavening agent.

The practical kneading and baking of the bread may take place by the use of conventional baking equipment.

In a typical process, at first dry blending of the solid ingredients is made and the yeast is stirred into water or milk with the chill off, the yeast is then added to the dry mix together with the egg white, the vegetable oil, the sour milk product, and water or milk until the consistency becomes like that of a thin dough.



If it is desired to reduce the phytine content of the wheat bran it is expedient to use a long leavening time at 20-30 °C in order to utilize the phytase naturally present in the wheat bran, for a reduction of the phytine content.

5 It is assumed, however, that the amounts of the bread-like product according to the invention that an individual patient is expected to consume are hardly so large that the phytine content of the wheat bran would present any problems even if no particular measures are taken to  
10 enhance the effect of the phytase.

During the leavening period the dough should be protected against drying out. After completion of the leavening the dough is stirred briefly and poured into greased baking trays for example in a thickness of 1 1/2-2  
15 cm.

Baking takes place in a preheated oven at about 200 °C for a typical baking period of 25-30 minutes.

The baked bread is then removed from the oven and afterdried on a baking grill.

20 The finished bread-like product is in the form of a disk, which may be cut into suitable pieces. The resulting slices of bread are suitable for serving covered with garniture possibly after having had a little butter or margarine spread on them, such as the Scandinavian "smørrebrød".  
25

Within the above-defined ratios between the ingredients, bread having an appearance varying between that of rye bread and graham bread may be made.

The product according to the invention is extremely  
30 suitable for freezing because as a consequence of the relatively high vegetable oil content it does not tend to dry out.

Although the good keeping quality of the product makes it suitable for industrial manufacture with a view to  
35 distribution in a frozen or non-frozen condition it is assumed, however, that a part of the consumers and the retail bakeries might wish to take care of the baking

themselves and the invention therefore also relates to a powder mix, which upon stirring with water and vegetable oil forms a dough, that may be baked to a bread-like product having blood sugar reducing effect for diabetics  
5 said mix being characterized in that it comprises the above-defined ingredients (a), (b), (d), (e), (f), and (g), the ingredients (e) and (f) being in the form of dry products and (g) being either dried yeast plus sugar or a baking powder, said ingredients being present in the mix in  
10 the above-defined proportions.

When using this mix only vegetable oil has to be added in an amount as described above, i.e. in such an amount that the ratio of ((a)+(b)) to vegetable oil is 3 to 8, preferably 2 to 7, together with water or milk to obtain  
15 the desired dough consistency. The remaining preparation is as described above.

The products according to the invention have been developed particularly for diabetics, but it is assumed that they can also be useful for the prevention of so-called adult-onset diabetes. Furthermore, the suitable  
20 distribution of nutritional ingredients in the products makes them particularly beneficial also to healthy persons, for example for a slimming treatment, which implies reduction of the carbohydrate consumption.

To further illustrate the invention, examples are presented below, which describe the manufacture of typical bread replacing products according to the invention together with test results, which illustrate the beneficial  
25 physiological effect achieved with diabetics that consume the product.  
30

#### Example 1

The following ingredients were mixed together:

35	Soya protein	36 g
	Wheat bran	30 g
	Desiccated coconut	14 g

9

Sugar	2,5 g
Salt	1,5 g

20 g of compressed yeast was stirred into 50 g of lukewarm water and added to 80 g Ylette®, 50 g of raw egg white, and 18 g of soya oil. A further 250 g of water were added to obtain a thin dough.

The dough was covered and set aside to rise at approximately 20 °C for 1-1/4 hour, stirred through and poured into a greased tray to form an approximately 2 cm thick layer. Baking took place in a preheated oven at 200 °C for 1/2 hour, the bread-like product was then taken out of the tray and afterdried upside down for approximately 10 minutes in the warm switched-off oven.

The resulting product was pleasant to the taste, easy to chew and with characteristics similar to graham bread.

#### Example 2

A powder mix was manufactured by mixing the following ingredients:

Soya protein	38	g
Desiccated coconut		
+sesame seeds (1:1)	14	g
Dried yeast	12	g
Salt	1,5	g
Sugar	2,5	g
Egg white powder	6	g
Wheat bran	30	g

30

The obtained mix is suitable for distribution as such, as just by adding vegetable oil, e.g. 12 g of olive oil + 6 g of soya oil, and water or milk to an adequate consistency it will provide a dough, which, when treated as described in example 1, will yield a product of the same quality as the one obtained in example 1.

The particularly suitable composition of the product

according to the invention from a nutritional standpoint is evident from the analytical results described below, at which the product manufactured according to example 1 has been compared with conventional types of bread:

5	<u>Analysis</u>	Product	Rye	Graham	White
		accord.	bread	bread	bread
		to example 1			
	Per 100 g				
10	Energy, kJ	974	960	1150	1135
	Energy, kcal	232	229	274	270
	Protein, g	11,3	5,8	8,2	7,7
	Fat, g	13,6	1,6	3,7	3,3
	Saturated fatty acids, g	4,4	0,2	0,7	0,9
15	Mono-unsaturated				
	fatty acids, g	2,6	0,2	0,6	0,6
	Poly-unsaturated				
	fatty acids, g	5,7	0,8	1,6	1,0
	Cholesterol, mg	1,4	0,0	0,0	0,0
20	Carbohydrates total, g	15,9	47,1	51,2	51,7
	Sugar, g	3,7	3,8	1,9	0,8
	Fibres, g	8,4	9,1	4,9	3,2
	Starch, g	1,6	35,7	36,1	48,7
	Ash, g	2,3	2,8	1,8	2,1
25	Water, g	47,4	42,3	34,4	34,5

#### Fatty Acids

	C 18:2, g	5,0	0,7	1,5	0,9
30	C 18:3, g	0,7	0,1	0,1	0,1
	C 20:4, g	0,0	0,0	0,0	0,0
	C 18:1, g	2,6	0,2	0,5	0,0

		Product accord. to example 1	Rye bread	Graham bread	White bread
5	Per 100 g				
	<u>Amino Acids</u>				
	Isoleucine, mg	560	230	320	330
10	Leucine, mg	984	410	550	580
	Lycine, mg	789	210	230	190
	Methionine, mg	250	95	120	120
	Cystine, mg	197	99	120	150
	Phenylalanine, mg	591	280	370	410
15	Tyrosine, mg	432	120	160	180
	Threonine, mg	470	210	220	230
	Tryptophan, mg	155	68	95	81
	Valine, mg	686	340	400	390
	Arginine, mg	773	270	370	310
20	Histidine, mg	310	140	170	180
	Alanine, mg	575	290	300	260
	Aspartic acid, mg	1207	410	450	370
	Glutamic acid, mg	2137	1350	2330	2470
	Glycine, mg	495	280	330	320
25	Proline, mg	684	550	780	890
	Serine, mg	653	280	390	410

	Product accord. to example 1	Rye bread	Graham bread	White bread
Per 100 g				
5				
Ca, mg	90,1	30,0	30,0	30,0
P, mg	273,1		230,0	88,0
Mg, mg	99,4	55,0	50,4	22,0
Fe, mg	2,2	4,2	4,7	3,2
10 Zn, mg	2,7	0,2	2,0	0,6
Cu, mg	0,4	0,2	0,3	0,1
I, mg	12,1	2,7	2,0	2,8
Mn, mg	1,9		1,2	0,6
Cr, µg	1,1		60,0	3,0
15 Se, µg	0,5		41,0	2,0
Mo, µg	2,1		32,0	0,0
Na, mg	238,0	700,0	287,0	325,0
K, mg	523,6	300,0	217,0	146,0
Vitamin A, ret.eqv.µg	5,7			25,0
20 Retinol, µg	3,9			
β-carotene, µg	10,5			
Vitamin D, mg	0,04			
Vitamin E, mg	4,3	0,3	0,3	0,5
α-Tocopherol, mg	3,3	0,2	0,3	0,5
25 Vitamin K <sub>1</sub> , µg	34,3			
Vitamin, mg	0,3	0,1	0,4	0,4
Vitamin B <sub>2</sub> , mg	0,3	0,1	0,5	0,5
Niacin equiv., mg	6,6	1,1	1,1	1,3
Niacin, mg	4,0	1,1	2,5	1,0
30 Tryptophan, mg	155,0	68,0	95,0	81,0
Vitamin B <sub>6</sub> , mg	0,3	0,2	0,2	0,1
Folacin, µg	323,6	23,0	54,0	36,0
Free folate, µg	24,3	7,0	17,0	8,0
Vitamin B <sub>12</sub> , µg	0,2	0,2		
35 Pantothenic acid, mg	0,8	0,6	0,8	0,5
Biotin, µg	5,8	3,0	6,0	4,8
Vitamin C, mg	0,1			

### Clinical Tests

The surprising blood reducing effect of the product according to the invention has been demonstrated with several patients with non-insulin-dependent diabetes. Thus, tests were made with a group of 10 patients at the age of 54 to 58 years. The comparative meals used comprised ordinary types of bread with a fibre content of 3,5% (standard deviation  $\pm 1,4\%$ ) and a starch content of 27,3% (standard deviation  $\pm 6,8\%$ ), butter, cheese, milk product, and marmalade. At the tests the conventional bread was replaced by an iso-caloric amount of bread manufactured according to example 1 (approx. 80-90 g), all the other ingredients remaining unchanged. The meals were taken in a randomized sequence at intervals of at least two days. Blood tests were taken prior to the meals and for every 15 minutes during the first hour and then every 30 minutes during the following 3 hours after the meals. The patients served as a comparative basis themselves.

At these tests such an increase of the area under the graph showing bloodsugar as a function of time was observed, that was equivalent to 630 mmol/l (standard deviation  $\pm 258$  mmol/l) per minute after intake of a comparative meal, and an increase of 182 mmol/l (standard deviation 154 mmol/l) per minute after intake of bread manufactured according to example 1. The increase in the maximum values of the blood sugar concentration was on an average 4,6 mmol/l (standard deviation  $\pm 1,3$  mmol/l) after intake of the control meal, and 1,5 mmol/l (standard deviation  $\pm 0,7$  mmol/l) after intake of the product according to example 1.

Tests with the product according to the invention have surprisingly shown that the blood sugar reducing effect is not limited to the hours between the intake of the product and the following meal. This is evident from fig. 1, which shows the change in the blood sugar concentration with a diabetic patient during 24 hours.

The arrows indicated at the times of 8 a.m., noon, 3 p.m., 6 p.m., and 8 p.m. indicate the time of the meals.

The three graphs I, II and III refer to the same patient. The graph I shows the results after the intake of ordinary diabetic diet. The graph II shows the results found after the patient during 6 weeks in the breakfast had replaced the conventional bread in iso-caloric amounts by a product manufactured according to example 1.

The graph III is based on values obtained when the patient after two weeks following that period returned to the ordinary diabetic diet.

The results of fig. 1 suggest a long-acting effect of the product according to the invention apparently not only ascribable to the fact that the product is poor in starch. The mere fact that the advantageous effect exceeds the time for the next meal when starch is eaten suggests that also factors other than the low starch content are important for the good results.

Tests have shown, however, that even a relatively small amount of starch can considerably impair the desired blood sugar reducing effect of the product in question.

At those tests the blood sugar increase with a patient was compared on test days when the following products were given as bread:

- (i) ordinary bread baked from conventional starch containing flour,
- (ii) a bread-like product according to the invention, or
- (iii) a bread-like product corresponding to the product according to the invention, but made with an addition of wheat flour in an amount equivalent to 7,7 g flour in the amount of the product consumed for breakfast.

The results are illustrated in fig. 2, in which the graph A shows the results obtained with ordinary bread, the graph B shows the results with the bread-like product according to the invention and graph C the results with the product according to the invention with addition of wheat



flour. The breakfast was taken at about 8 a.m. and a lunch meal, which was identical in all three tests and conventionally composed, was served at about noon.

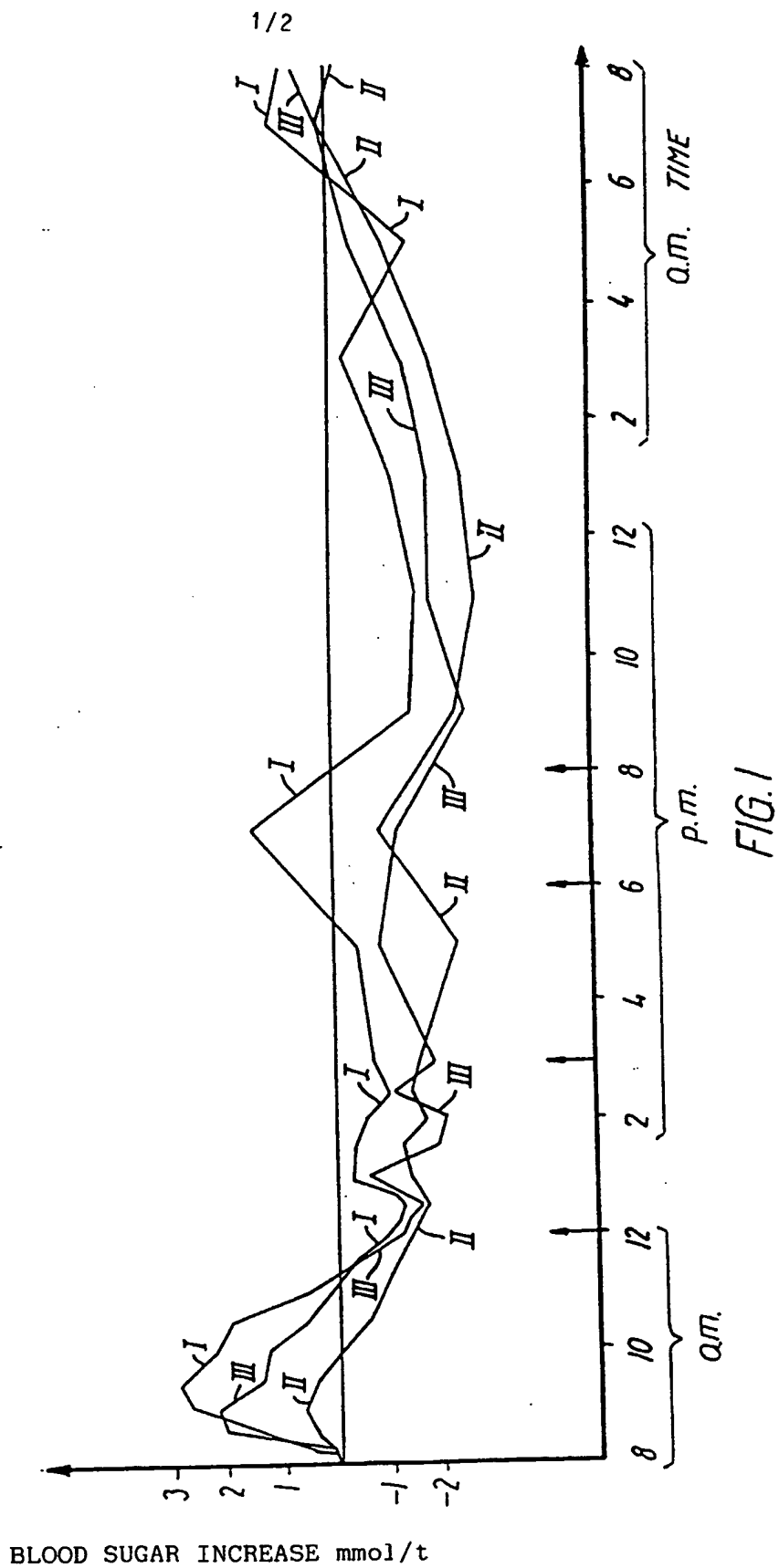
Fig. 2 confirms the blood sugar reducing effect of the product according to the invention, but it is particularly interesting by showing that even a minor amount of flour added to the product makes its useful effect compared with ordinary bread almost disappear. On the basis hereof it can be concluded that the numerous known protein enriched types of bread, in which only a partial replacement of flour by protein or a similar product has been made, are unsuitable for treatment of diabetes.

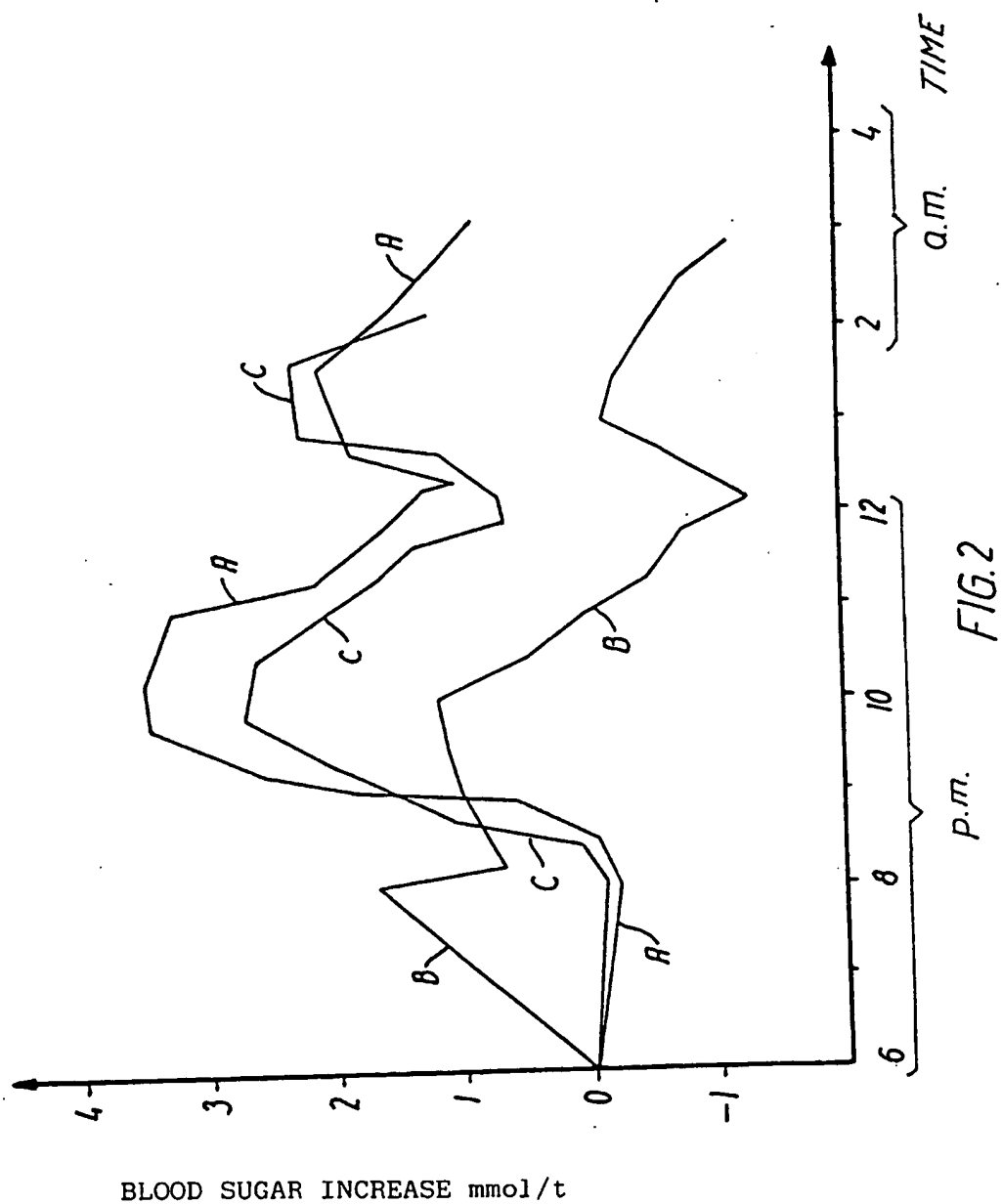
C L A I M S

1. A bread-like product having a blood sugar reducing effect for diabetics, said product being characterized in that it is manufactured by baking of a dough comprising the following ingredients:
- 5 (a) soya protein,  
(b) a fibre component comprising at least 50% by weight of wheat bran,  
(c) vegetable oil,  
10 (d) a fat-containing, substantially starch-free nut and/or kernel component,  
(e) a preferably viscous, possibly protein enriched, low-fat sour milk product, possibly in the form of a dry powder,  
15 (f) egg white, possibly in the form of a dry powder, and  
(g) a leavening agent,  
the weight ratios of the ingredients, calculated on dry matter, being as follows:
- 20 (a) to (b) from 0,3 to 3 (understood as the value of a/b being in the interval from 0,3 to 3),  
((a)+(b)) to (c) from 3 to 8,  
((a)+(b)) to (d) from 3 to 7,  
((a)+(b)+(d)) to (e) from 8 to 12 and  
25 ((a)+(b)+(d)) to (f) from 12 to 20.
2. A bread-like product according to claim 1, characterized in that the ratios by weight of the ingredients defined in claim 1 are as follows:
- (a) to (b) from 0,5 to 2,  
30 ((a)+(b)) to (c) from 2 to 7,  
((a)+(b)) to (d) from 4 to 6,  
((a)+(b)+(d)) to (e) from 9 to 11 and  
((a)+(b)+(d)) to (f) from 14 to 18.
3. A bread-like product according to claim 1 or 2,  
35 characterized in that the ingredient (b) is wheat bran.
4. A bread-like product according to claim 1, 2 or 3, characterized in that the ingredient (c) is olive oil

and/or an oil containing a mainly poly-unsaturated fatty acid component.

- 5 5. A bread-like product according to any of the preceding claims, characterized in that the ingredient (d) is desiccated coconut, sunflower or sesame seeds or a mixture thereof.
6. A product according to any of the preceding claims, characterized in that the ingredient (e) is Ymer or preferably Ylette®.
- 10 7. A product according to any of the preceding claims, characterized in that the ingredient (g) is yeast plus sugar in an amount, which is not much larger than that which is consumed by the yeast by its function as a leavening agent.
- 15 8. A powder mix, which upon stirring with water and vegetable oil forms a dough, that may be baked to a bread-like product having a blood sugar reducing effect for diabetics, said mix being characterized in that it comprises the ingredients (a), (b), (d), (e), (f), and (g),  
20 defined in claim 1, the ingredients (e) and (f) being in the form of dry products and (g) being either dried yeast plus sugar or a baking powder, said ingredients being present in such proportions by weight as defined in claim 1.
- 25 9. A powder mix according to claim 8, characterized in that the ingredients are present in such proportions by weight as defined in claim 2.





## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 93/00212

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC5: A21D 13/06, A21L 2/08 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
IPC5: A21D, A21L		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
SE,DK,FI,NO classes as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
WPI		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 4109018 (THOMPSON, J.B.), 22 August 1978 (22.08.78), column 2, line 22 - line 23; column 2, line 45 - line 46; column 19, line 12 - line 19, claims 1,10 --	1-9
A	US, A, 4824683 (HODGSON, W.W. ET AL.), 25 April 1989 (25.04.89), column 2, line 20, claims 1-10 --	1-9
A	DE, A1, 4001905 (MENGE, W.), 25 July 1991 (25.07.91), claims 1-4 --	1-9
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: *A* document defining the general state of the art which is not considered to be of particular relevance *B* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art *&* document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
7 Sept 1993		14 -09- 1993
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer  INGA-KARIN PETERSSON Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 93/00212

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE, A1, 3614465 (HOFMEIR, H.), 5 November 1987 (05.11.87), claims 1-17  --	1-9
A	Dialog Information Service, File 351, WPIL, Dialog accession no. 004157535, WPI accession no. 84-303074/49, (NISO), "Novel food material prepn. by binding powdery edible fibre to protein.", & JP,A,59187745, publ. 841024  -- -----	1-9

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

30/07/93

International application No.  
PCT/DK 93/00212

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4109018	22/08/78	GB-A- 1538360	17/01/79
US-A- 4824683	25/04/89	NONE	
DE-A1- 4001905	25/07/91	NONE	
DE-A1- 3614465	05/11/87	NONE	